

Novel Conductive Water Removal Membrane (CWRM) for PEM Passive Fuel Cell Operation, Phase I

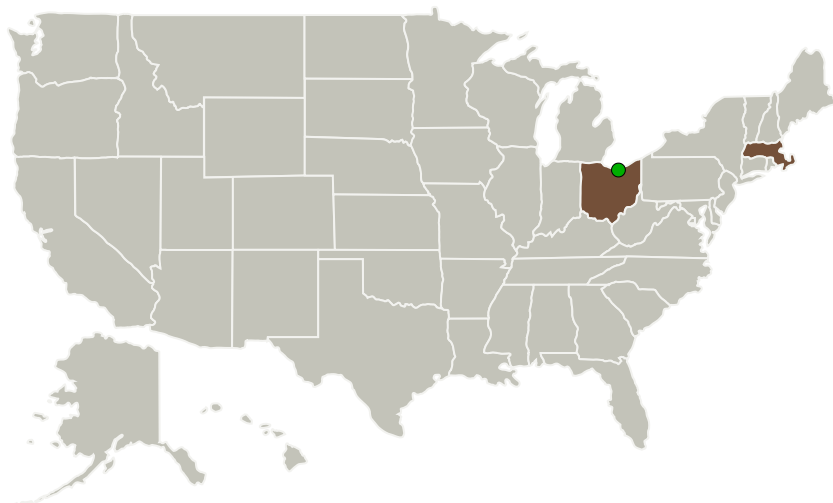
Completed Technology Project (2010 - 2010)



Project Introduction

Too much water, resulting in flooding, or too little water, resulting in electrolyte dryout, have both had negative impact upon fuel cell performance. ElectroChem proposes an SBIR research project to develop a Conductive Water Removal Membrane (CWRM) for PEM fuel cells operating at higher current densities in a passive mode. The membrane will 1) be wettable; 2) allow water to penetrate easily; 3) not permit gas to leak through; 4) be electrically conductive. ElectroChem proposes two approaches for fabrication. (1) integrate a highly electrically conductive material with a polymer membrane which provides the desired water permeation and gas retardation properties and (2) a CWRM membrane will be made with nanostructure materials. At the end of Phase I we expect to document the analytical / experimental results validating the key parameters of CWRM. At the end of Phase II we expect to document the test performance of CWRM in a PEM fuel cell in agreement with the analytic predictions of Phase I. Success of the proposal to develop a Conductive Water Removal Membrane (CWRM) will enable PEM fuel cells to operate at very high current densities passively.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
ElectroChem, Inc.	Lead Organization	Industry Minority-Owned Business, Women-Owned Small Business (WOSB)	Woburn, Massachusetts
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations

Massachusetts	Ohio
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Project Transitions

**January 2010:** Project Start**July 2010:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140114>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

ElectroChem, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Shyhing Pien

Co-Investigator:

Michael Pien

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Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.1 Power Generation and Energy Conversion
 - └ TX03.1.4 Dynamic Energy Conversion

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System